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Introducing Targeted Venom Discovery Arrays (T-VDA™)

Unique venom libraries for YOUR drug discovery programmes

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Unlock millions of years of evolution...

The Targeted Venom Discovery Array (T-VDA™) is specifically designed to maximise discovery of new drug discovery tools such as ion channels and in disease areas such as pain, antibiotics and cardiovascular disease. Venoms from theraphosids (tarantulas), scorpions and snakes are rich sources of new drug discovery tools. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in specific pathways from the literature to act as positive controls. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential

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Target:	Acid Sensing Ion Channels
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{ASIC}

Product Description

The ASIC (Acid Sensing Ion Channel) Targeted Venom Discovery Array™ (T-VDA^{ASIC}) is specifically designed to maximise discovery of new tools. ASIC channels are important drug targets for neurological disorders, specifically pain. ASIC channel tools from theraphosids (tarantulas) and snakes are the most potent and selective agents currently known. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active at ASIC channels from the literature to act as positive controls. The control venoms for T-VDA^{ASIC} include *Psalmopoeus cambridgei* (Trinidad chevron tarantula) which contains Psalmotoxin, a selective blocker of ASIC1a channels[1]; *Dendroaspis polylepis* (Black mamba) venom which contains Mambalgins that block ASIC1a/2a heteromers[2]; and *Dendroaspis angusticeps* (Eastern green mamba) venom which contains mambalgin-3 that blocks ASIC1a and ASIC1b channels as well as 1a/2b heteromers[3]. Other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Data compiled from UniProt: Reorganizing the protein space at the Universal Protein Resource (UniProt), Nucleic Acids Res. 40: D71-D75 (2012).

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Target:	Calcium Channels
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{Ca2+}

Product Description

The calcium (Ca^{2+}) channel Targeted Venom Discovery Array™ (T-VDA^{Ca2+}) is specifically designed to maximise discovery of new tools. Ca^{2+} channels are important drug targets for a range of neurological disorders, specifically pain. Venoms from theraphosids (tarantulas), scorpions and snakes are rich sources of new Ca channel tools. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active on calcium channels from the literature to act as positive controls. The control venoms for T-VDA^{Ca2+} include *Parabuthus transvaalicus* (South African fattail scorpion) which contains Kurtoxin with broad spectrum calcium channel activity L,T,N and P type channels[1]; *Dendroaspis angusticeps* (Eastern green mamba) venom which contains Calcicludin, a potent L-type calcium channel blocker[2]; and *Hysterocrates gigas* (Cameroon red baboon tarantula) venom which blocks N and E type calcium currents[3]. Other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	Potassium Channels
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{K+}

Product Description

The potassium (K^+) channel Targeted Venom Discovery Array™ is specifically designed to maximise discovery of new tools. K^+ channels are important drug targets for a range of neurological disorders including pain. Venoms from scorpions, snakes and spiders are rich sources of new K^+ tools. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active on potassium channels from the literature to act as positive controls. The control venoms for T-VDA^{K+} include *Dendroaspis polylepis* (black mamba snake) where Dendrotoxin K[1] was discovered; *Pandinus imperator* (emperor scorpion) where several selective potassium channel tools have been discovered[2]; and *Grammostola rosea* (Chilean rose tarantula) which also contains a diverse collection of toxins including gating modifiers[3]. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	Sodium Channels
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{Na+}

Product Description

The sodium (Na^+) channel Targeted Venom Discovery Array™ (T-VDA^{Na+}) is specifically designed to maximise discovery of new tools. Na^+ channels are important drug targets for a range of neurological disorders, specifically pain. Venoms from theraphosids (tarantulas), scorpions and snakes are rich sources of new Na^+ tools. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active on sodium channels from the literature to act as positive controls. The control venoms for T-VDA^{Na+} include *Thrixopelma puriens* (Peruvian velvet tarantula) where Protox II, a gating modifier of NaV1.7[1], was discovered; *Androctonus australis* (Sahara scorpion) where several selective sodium channel tools have been discovered[2]; and *Crotalus durissus* (South American rattlesnake) venom which contains crotamine[3], one of the very few snake-derived Na^+ channel toxins. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	Pain – analgesics and antinociceptives
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{pain}

Product Description

The Pain Targeted Venom Discovery Array (T-VDA) is specifically designed to maximise discovery of new analgesic tools. Ion channels are very important pain targets along with receptors such as opioids and acetylcholine. Venoms from theraphosids (tarantulas), scorpions and snakes are rich sources of new analgesic tools. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in analgesic pathways from the literature to act as positive controls. The control venoms for T-VDA^{pain} include *Thrixopelma puriens* (Peruvian velvet tarantula) where Protox II, a gating modifier of NaV1.7[1], was discovered; *Leiurus quinquestriatus* (death stalker scorpion) where opioid selective tools have been discovered[2]; and *Dendroaspis polylepis* (black mamba) venom which contain mambalgins[3] - potent and selective ASIC channel tools. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Data compiled from UniProt: Reorganizing the protein space at the Universal Protein Resource (UniProt), Nucleic Acids Res. 40: D71-D75 (2012).

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Target:	Cardiovascular – coagulation, blood pressure, haemorrhage
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{CV}

Product Description

Venoms are a proven therapeutic resource with several drugs on the market in cardiovascular biology such as anticoagulants and antihypertensives. Snake venoms are a rich source of new cardiovascular tools such as C-type lectins, serine proteases, natriuretics and a wealth of signalling peptides. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in analgesic pathways from the literature to act as positive controls. The control venoms for T-VDA^{CV} include *Crotalus adamanteus* (eastern diamondback rattlesnake) where several bradykinin potentiating peptides have been discovered[1]; *Dendroaspis angusticeps* (eastern green mamba) where several novel natriuretic peptides have been discovered[2]; and *Bitis gabonica* (Gaboon viper) venom which contains a large abundance of serine proteases and, in particular, rhinocerase[3]. Other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Data compiled from UniProt: Reorganizing the protein space at the Universal Protein Resource (UniProt), Nucleic Acids Res. 40: D71-D75 (2012).

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Target:	Insecticides
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{insect}

Product Description

The insecticide Targeted Venom Discovery Array™ (T-VDA^{insect}) is specifically designed to maximise discovery of new insecticide tools. Venoms are a rich source of insect-specific toxins as many arthropods have evolved these toxins for efficient prey capture. Insect-specific toxins from theraphosids (tarantulas) and scorpions are the most likely to yield the most useful materials. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active at insect targets from the literature to act as positive controls. The control venoms for T-VDA^{Insect} include *Leiurus quinquestriatus* (death stalker scorpion) which contains several insect-specific toxins – excitatory and inhibitory[1]; *Brachypelma smithi* (Mexican red-kneed tarantula) venom that contains insect-specific sodium channel toxins with no mammalian activity[2]; and *Phoneutria nigriventer* (Brazilian armed spider) venom which contains another insect-specific neurotoxin[3]. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Data compiled from UniProt: Reorganizing the protein space at the Universal Protein Resource (UniProt), Nucleic Acids Res. 40: D71-D75 (2012).

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Target:	Antimicrobial – bacteria, fungi and parasites
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{Microbe}

Product Description

With antibiotic resistance a significant global threat, venoms are proving a rich source of new molecules. The antimicrobial Targeted Venom Discovery Array (T-VDA™) is specifically designed to maximise discovery of new tools. Novel antimicrobial peptides and proteins have been found in venoms from snakes, spiders and scorpions. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel antimicrobials. Each array contains characterised venoms active on microbial growth and survival from the literature to act as positive controls. The control venoms for T-VDA^{microbe} include *Naja kaouthia* (monocled cobra) as well as many other snake venom proteins such as phospholipase A2 and L amino acid oxidase, which have been shown to be bacteriocidal[1]; *Pandinus imperator* (emperor scorpion) where several antimicrobial peptides have been discovered[2]; and *Psalmopoeus cambridgei* (Trinidad chevron tarantula) where antiplasmodial ICK peptides have been discovered[3]. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise the novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	Oncology
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{oncol}

Product Description

Venoms are a proven therapeutic resource with several drugs in development for cancer therapeutics such as antimetastics and tumour cell apoptosis. Snake venoms are rich source of new oncology tools including disintegrins, L-amino-acid oxidase and a wealth of signalling peptides. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in analgesic pathways from the literature to act as positive controls. The control venoms for T-VDA^{Oncol} include *Agkistrodon contortrix* (Southern copperhead) where the disintegrin Contortrostatin was discovered[1]; *Deinagkistrodon acutus* (hundred pace pit viper) which contains an L-amino_acid oxidase enzyme that induces apoptosis in HeLa cancer cells[2]; and *Leiurus quinquestriatus* (death stalker scorpion) venom which contains small neurotoxic peptides that block chloride channels and can label gliomas[3]. The other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	Enzymes – PLA2, SVMPs, PDEs, LAO & SP
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{Enz}

Product Description

Enzymes are incredibly useful tools in a wide range of disciplines and industrial processes. Snake venoms are a rich source of enzymes such as phospholipases (PLA2), snake venom metalloproteinase (SVMP), phophodiesterases, L-amino-acid oxidase (LAO) and many more. Morevoer, invertebrate venoms also often contain enzymes such as phospholipase. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in analgesic pathways from the literature to act as positive controls. The control venoms for T-VDA^{Enz} include phospholipase A2-containing *Naja nigricollis* venom (black-necked spitting cobra)[1]; *Deinagkistrodon acutus* (hundred pace pit viper) which contains an L-amino-acid oxidase enzyme that induces apoptosis in HeLa cancer cells[2]; and *Crotalus adamanteus* (Eastern diamondback rattlesnake) venom which contains snake venom metalloproteinases such as Adamalysin[3]. Other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

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Target:	G-protein coupled receptors
Format:	Targeted Venom Discovery Array
Code:	T-VDA^{GPCR}

Product Description

Although not typically expected as a pathway for venoms, GPCR modulation has been discovered in several snake venoms including muscarinic acetylcholine receptor blockers. Snake venoms are a rich source of GPCR tools such as the three-finger toxin motif that is particularly effective at binding GPCRs. These targeted arrays contain pure venom fractions from 12, 24, 48 or 96 species optimised for identification of novel tools. Each array contains characterised venoms active in GPCR pathways from the literature to act as positive controls. The control venoms for T-VDA^{GPCR} include *Crotalus atrox* (western diamondback rattlesnake) where the bradykinin B2 receptor antagonist has been discovered[1]; *Dendroaspis angusticeps* (eastern green mamba) where several novel muscarinic receptor antagonists have been discovered[2]; and *Naja kaouthia* (monocled cobra) venom which contains a large abundance of three-finger proteins including antagonising nicotinic and muscarinic nicotine receptors[3]. Other venom fractions making up the library have been specially selected by our drug discovery scientists to maximise novel hit potential.

- Venoms are supplied lyophilised in Echo® qualified acoustic source plates (Labcyte Inc) and are useable on any SBS footprint liquid handling device or by hand.
- 384-well format has 1µg venom fraction per well, re-suspension with 30µl will produce ~1.6µM-16µM stock concentration of peptides.
- 1536-well format has 300ng venom fraction per well, re-suspension with 10µl will produce ~1.5µM-15µM stock concentration of peptides.

1. Calvete J.J., Fasoli E., Sanz L., Boschetti E., Righetti P.G. (2009). Exploring the venom proteome of the western diamondback rattlesnake, *Crotalus atrox*, via snake venomics and combinatorial peptide ligand library approaches. J. Proteome Res. 8:3055-3067
2. Max S.I., Liang J.-S., Potter L.T. (1993). Purification and properties of m1-toxin, a specific antagonist of m1 muscarinic receptors. J. Neurosci. 13:4293-4300
3. Utkin Y.N., Kukhtina V.V., Kryukova E.V., Chiodini F., Bertrand D., Methfessel C., Tsetlin V.I. (2001). 'Weak toxin' from *Naja kaouthia* is a nontoxic antagonist of alpha 7 and muscle-type nicotinic acetylcholine receptors. J. Biol. Chem. 276:15810-15815

Data compiled from UniProt: Reorganizing the protein space at the Universal Protein Resource (UniProt), Nucleic Acids Res. 40: D71-D75 (2012).

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VENOMTECH®
Venom Research Solutions™

Target: Format:	Hit-to-Lead Service
Code:	T-VDA^{HTLS}

Service Description

Unlock the full potential of the Targeted Venom Discovery Arrays™ (T-VDAs) with this custom hit characterisation and lead optimisation service. The Venomtech® team have decades of experience in global pharmaceutical drug discovery coupled with specialist knowledge of venoms and venomous animals. Using our industry-leading proprietary safe working practices we turn millions of years of evolution into the ultimate drug discovery pipeline. This starts with the T-VDA already optimised to provide biological tools in areas where synthetic chemistry has failed or where a biological is specifically sought.

The quarterly subscription covers:

- Characterisation of active fractions (LC-MS, MALDI TOF, MS/MS)
- Separation to single actives where desired
- Resupply of actives for dose response testing
- Provision of extra targeted venoms to improve potency and/ or selectivity
- Identification of potential SAR (Structural Activity Relationships)
- Small scale synthesis of the active
- Full confidential project report with strategic projections

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